

Inflatable Module Seal Interface Development and Testing

Completed Technology Project (2011 - 2012)



Project Introduction

Develop a repeatable low permeable sealing interface evaluating O-ring, RTV bond and flowed RTV bond methods. Advanced Bladder materials (ArmorFlex, Nanoclay, etc) were developed by ILC Dover in FY2011 and will be evaluated and tested. Cold flow and assembly process testing will be performed utilizing 6-in x 6-in and 6-in x 12-in test articles (Figure 1a and 1b). Leak testing will be performed utilizing a 4-foot diameter test fixture. Bladder materials to be tested include: ArmorFlex 101 (Polyurethane, gas barrier, polyurethane) ArmorFlex 101 w/ Nylon rip-stop NanoClay NanoClay w additional gas barrier layer Nanoclay w/ rip-stop CEPAC HD-200 (Bigelow bladder preferred embodiment)

Inflatable structures will require low permeable bladder to metallic seal interface. Cold flow of bladder materials over time is not acceptable for long term missions where materials cannot be easily inspected or replaced. Reliable seal interfaces are required. Inflatable habitats can provide the volume necessary for space colonization at a lower cost than traditional habitats. Sealing bladder materials capable of deploying at cold temperatures is essential for deep space missions and likely LOE missions due to operational constraints

Anticipated Benefits

Through development of this technology NASA will be able to design and fabricate a reliable seal interface in support of space missions, advise contractors of reliable sealing methods, and be a smart buyer of alternate methods developed by aerospace companies.



Project Image Inflatable Module Seal Interface Development and Testing

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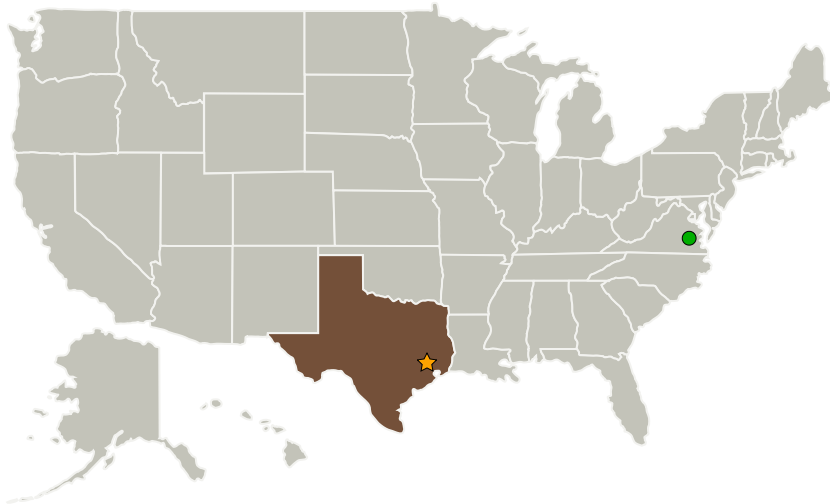
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

Texas

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Innovation Fund: JSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

Gerard D Valle

Principal Investigator:

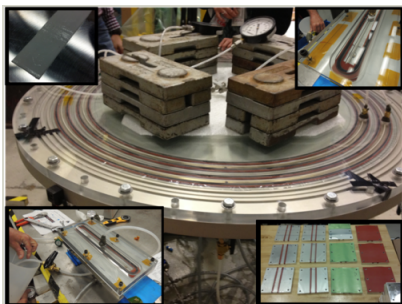
Gerard D Valle

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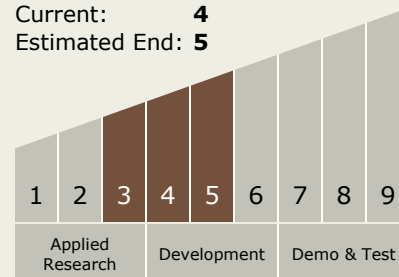
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Images

**12145-1377120352667.png**Project Image Inflatable Module
Seal Interface Development and
Testing<https://techport.nasa.gov/image/2248>

Links

NTR 1
(no url provided)Technology Maturity
(TRL)Start: **3**
Current: **4**
Estimated End: **5**

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.1 Integrated Systems and Ancillary Technologies